

An Analysis of Factors Related to Receipt of Accommodations and Services by Postsecondary

Students With Disabilities

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Abstract

A secondary analysis of the National Longitudinal Transition Study-2 examined the relationship between demographic, disability-related, secondary school preparation, and transition planning variables and receipt of accommodations and other disability-specific services at the postsecondary level for 2,470 postsecondary students with disabilities. The results indicated that secondary students who received transition planning education were more likely to receive accommodations and other disability-specific services in 2-year colleges and that those who had a transition plan that specified postsecondary accommodations and supports as a needed post-high school service were more likely to receive those types of services in 2-year colleges and in career and technical education schools. These findings suggest that secondary schools can influence the likelihood that students will seek out and receive postsecondary accommodations and other disability-specific services. (Contains 1 table)

An Analysis of Factors Related to Receipt of Accommodations and Services by Postsecondary Students With Disabilities

Approximately 11% of all postsecondary students reported having one or more disabilities during the 2008 academic year (United States Government Accountability Office, 2009). When individually appropriate, postsecondary institutions must ensure that these students have access to both the physical and instructional environment through the provision of academic adjustments (also known as accommodations) and auxiliary aids (Office for Civil Rights, 2007). To be eligible for such services, students must disclose their disability to the institution and provide documentary evidence of the impact of the disability (Madaus, 2006; Office for Civil Rights, 2007). Self-disclosure is voluntary, but without it, postsecondary schools need not provide accommodations, nor must they provide them retroactively to students (Madaus, 2006).

Emerging data indicate that the rate of self-disclosure in college is low. Newman and Madaus (2014) analyzed data from the National Longitudinal Transition Study-2 (NLTS2) and reported that only 35% of the students with disabilities who attended any type of postsecondary school self-disclosed the disability to the institution. Likewise, the receipt of accommodations and services on the basis of a disability is significantly lower in postsecondary school than in secondary school. Newman and Madaus found that whereas 98% of the sample had received at least one accommodation, modification, or disability-related service while in high school, only 24% did in postsecondary institutions. This figure is comparable to one from the 1999–2000 academic year, in which 26% of postsecondary students with disabilities reported receiving

services (National Center for Education Statistics, 2003).

Prior research has identified some potential reasons why disclosure and rate of accommodation receipt are lower at the college level than at the secondary level. These include the impact of self-determination skills, academic preparation and transition planning at the secondary level, and the student's disability. Each is described below.

Self-Determination

Self-determination involves several component elements, including but not limited to decision-making, self-awareness, and self-knowledge (Wehmeyer, 1995). For many college students with disabilities, the transition to college presents an immediate need to make decisions regarding their disability-related needs. In particular, should the student seek out and receive accommodations and other disability-related services? Salzer, Wick, and Rogers (2008) reported that nearly half the students with disabilities studied did not receive accommodations because they reported not needing them. Likewise, data from NLTS2 indicated that 50% of students who received special education services in high school did not self-disclose in college because they did not consider themselves to be a person with a disability (Newman & Madaus, 2014). These statistics may be very encouraging and reflect students who have found a good fit between their strengths and needs and their college plan of study.

However, other research indicates that seeking out needed services may be a challenge for many students with disabilities because they lack knowledge about legal rights, about available services, and about their specific disability and its impact on learning (Denhart, 2008; Lightner, Kipps-Vaughan, Schulte, & Trice, 2012; Walker & Test, 2011). For example, Getzel and Thoma (2008) reported the results of focus groups with 34 postsecondary students with disabilities. Many of them described not self-advocating for services, failing their courses, and

then choosing to self-disclose their disability. The participants then described the need to develop skills such as problem solving, learning about their disability, and self-management to improve their academic standing and remain in school. Research indicates that students with disabilities who earn higher grade point averages (GPAs) and achieve academically within their college plans of study are better able to understand their disabilities and advocate for their needs (Barber, 2012; Durlak, Rose, & Bursuck, 1994; Getzel & Thoma, 2008), the result often being self-disclosure.

Other key elements of self-determination are the abilities to solve problems and to set and attain goals (Wehmeyer, 1995). As described by Martin, Portley, and Graham (2010), self-determined students establish goals based on needs and interests, then develop and implement plans to meet these goals. Because academic and other personal support services may be available informally at postsecondary institutions or outside of the services offered by the institution, students may need to make and carry out plans to obtain needed services. The finding by Newman et al. (2011) that of the students who received some form of help while in postsecondary education, from one third to one half (among students with different types of disabilities) received it independently of the college is indicative of self-determined behavior among those students. This independently received help also can impact overall academic progress. Mamiseishvili and Koch (2011) found that college students with disabilities who did not participate in activities to improve course performance (e.g., study groups and meeting with faculty advisors) had lower levels of first- to second-year persistence than those who did participate in such activities.

Academic Preparation and Transition Planning

Hitchings, Retish, and Horvath (2005) studied the academic planning for a sample of 110

high school students with disabilities and reported that when the students were sophomores, 77% of the students expressed interest in attending two-year or four-year colleges. However, an examination of transcripts and Individualized Education Programs (IEP) for the first two years of high school revealed that only four students were enrolled in college preparatory classes. By the end of the junior year, only one student remained in such courses, with the others switched to general education or career related courses. The authors noted that the academic and behavioral skills needed to be successful in college preparatory courses must be developed prior to high school, and that a short-term solution to academic difficulty is to transfer the student to less rigorous courses.

The transition planning services students received at the secondary level also can influence postsecondary experiences. Barber (2012) found that students reported holding negative attitudes about special education received in high school and expressed reluctance to receive college-level services. Lightner et al. (2012) reported that students who disclosed a disability earlier in their college career had received more transition orientation in high school than those who disclosed later. Using data from both NLTS2 and the Education Longitudinal Study of 2002, Lee (2011) found that students with disabilities were more likely than students without disabilities to choose science, technology, engineering, and mathematics (STEM) majors. However, it was also noted that students with disabilities in STEM majors received fewer accommodations than those in non-STEM majors. Lee called for IEP team members to create opportunities that enable students to be fully involved in STEM classes, with appropriate accommodations and services, noting that they are “critical to their retention, graduation, and transition to STEM careers” (p. 77).

Karp and Bork (2012) suggested that new community college students in general do not

know what support resources are available or how to access them after becoming aware of them. This appears to be the case with students with disabilities as well, and many are not aware of their rights and procedures for requesting services (Lightner et al., 2012; Megivern, 2002; Salzer et al., 2008). Kurth and Mellard (2006) reported that many of the students who were surveyed or who participated in focus groups did not know that they could ask for different accommodations during a semester. Such knowledge should be a component of transition planning for students with disabilities.

Disability Type

Differences in the nature of youth's disabilities can have a powerful influence on their experiences and their preparation for, access to, and persistence in college (Flexer, Daviso, Baer, Queen, & Meindl, 2011; Hitchings et al., 2005; Lee, 2011; Mamiseishvili & Koch, 2011, 2012; Newman et al., 2011). Research indicates that levels of self-determination vary by disability category (Shogren et al., 2007; Shogren, Kennedy, Dowsett, & Little, 2014; Shogren, Kennedy, Dowsett, Garnier Villarreal, & Little, 2014; Wehmeyer & Garner, 2003). For example, Shogren, Kennedy, Dowsett, and Little reported that students with intellectual disabilities, autism, or multiple disabilities had lower mean scores for the psychological empowerment construct on the Arc's Self-Determination Scale (Arc's SDS; Wehmeyer, 2000) than those with high-incidence disabilities (learning disabilities, emotional disturbances, speech or language impairments, and other health impairments). Additionally, Shogren, Kennedy, Dowsett, Garnier Villarreal, et al. reported that Hispanic youth scored lower than African American or White youth on the autonomy, self-realization, and psychological empowerment scales. However, the authors reported that these differences were not significant across all disability categories.

Fears of stigma, discrimination, and professors' attitudes appeared to be driving forces in

student decision-making regarding receipt of disability-related services, particularly among students with psychiatric disabilities (Kurth & Mellard, 2006; Martin, 2010; Salzer et al., 2008). Martin (2010) found that a majority of students with mental health issues did not self-disclose because of fears of discrimination, even though those students who did self-disclose reported improved academic outcomes.

Rationale for the Present Study

Self-disclosure of a disability at the postsecondary level is voluntary, and data clearly demonstrate that self-disclosure rates are low, with only 35% of students who received services in high school self-disclosing to their postsecondary institutions (Newman & Madaus, 2014). However, approximately 50% of those students in 2-year and 4-year colleges and more than 30% of those in career and technical education (CTE) schools who did not receive accommodations and supports in postsecondary school asserted that they would have been helpful (Newman et al., 2011). It is important to determine what factors lead to this gap. Although the existing literature identified some potential reasons why disclosure and accommodation rates are lower at the postsecondary than secondary level (e.g., self-determination, transition planning, disability type), these studies have been conducted with small convenience samples that include youth in one or only a few disability categories. Furthermore, fairly limited data sources often preclude examining the wide array of potential correlates that could illuminate the factors associated with variations in receipt of postsecondary support. In addition, there is a paucity of data on the role of personal characteristics, such as gender, race/ethnicity, and family socioeconomic status, in relation to receipt of services at the postsecondary level. NLTS2, a large-scale, nationally representative data set, provides the opportunity to fill these existing gaps in the literature. Thus, the present study explored the roles of student characteristics and secondary school experiences

related to receipt of postsecondary accommodations and other disability-specific services.

Furthermore, this exploratory study examined to what extent these factors differed by type of postsecondary institution, an important consideration given the range of postsecondary options available to students with disabilities. Specifically, this study asked: What are the student characteristics and secondary school experiences related to receipt of postsecondary accommodations and other disability-specific services, and to what extent do these factors differ by type of postsecondary institution?

Method

Sample

The findings in this paper are based on secondary analyses of data from NLTS2. Funded by the U.S. Department of Education in 2000, with an initial sample of more than 11,000 students, NLTS2 produced the largest data set available to examine the experiences and outcomes of postsecondary school students with disabilities, and it is the only one that can address these topics for students with disabilities nationally. By identifying students with disabilities in high school and following their experiences longitudinally from high school to college, NLTS2 data include information that represents the complete population of postsecondary students with disabilities. In contrast, the samples in most other studies of postsecondary students with disabilities have been limited to the 35% of postsecondary students who self-identify, nearly completely overlooking the 65% of students with disabilities who do not self-identify (Newman & Madaus, 2014).

The NLTS2 two-stage sampling plan first randomly sampled local educational agencies (LEAs) and state-supported special schools stratified by region, district enrollment, and district wealth. Students ages 13–16 in grade 7 or above and identified by their school districts as

receiving special education services as of December 1, 2000, then were randomly selected from rosters of 500 LEAs and 40 special schools to yield nationally representative estimates of students with disabilities as a whole and in each of 12 federally recognized disability categories. Sample selection, sample attrition, and representativeness were more fully described by SRI International (2000) and Javitz and Wagner (2005). Weights were computed by taking into account various youth and school characteristics used as stratifying variables in the sampling and nonresponse in those strata. Details on the weighting strategy have been published (Newman et al., 2011). NLTS2 data were collected over a 9-year period (2001–2009) in five waves of data collection conducted every other year. By the final data collection wave, youth were 21 to 25 years old.

The present study included the approximately 2,470 NLTS2 sample members who had at least one Wave 2 through 5 parent or youth interview/survey in which the youth was reported to have attended at least one of the three types of postsecondary institutions (2-year colleges, 4-year colleges, or CTE schools). Much of the information came from the youth themselves in responses to either a telephone interview or a self-administered mail survey. Data for youth who were reported by parents to be unable to respond for themselves or who did not respond to interview or survey attempts were provided by parents. Response rates for Waves 2 through 5 ranged from 61% in Wave 2 to 48% in Wave 5. Unweighted sample sizes in this paper were rounded to the nearest 10, as required by the U.S. Department of Education when restricted data sets are used.

NLTS2 Data Sources

Parent/young adult interviews/surveys. Interviews were conducted with parents in English and Spanish using Computer Assisted Telephone Interviewing (CATI). Interviews also

were attempted with sample members who were at least 18 years old and who were reported by parents to be able to respond for themselves by telephone. Mail questionnaires were sent to parents who could not be reached by phone and to young adults who were reported to be able to answer questions for themselves but not by telephone (e.g., those who were deaf).

School district rosters. Information about the primary disability category of NLTS2 sample members came from rosters of students receiving special education services under the auspices of participating school districts and state-supported special schools.

In-person interviews. Interviews were conducted in person during the data collection wave in which young adults were 16–18 years old. Measures of self-determination skills were included in these interviews.

High school transcripts. Eight waves of transcript requests for NLTS2 sample members were sent to secondary schools between March 2002 and September 2009. A transcript was considered complete if it indicated that a student had graduated, completed his or her high school program, aged out, or dropped out and included information for all grading periods the student had been in high school.

School program surveys. Surveys were completed in 2002 and 2004 by high school staff who were most knowledgeable about students' overall school programs. For details on data sources, see Newman et al. (2011).

Measures

Dependent measures. Receipt of accommodations and other disability-specific services from each of three types of postsecondary schools—2-year or community colleges, 4-year colleges or universities, and CTE schools—were the dependent measures in the analyses. The data sources for these variables were the parent/youth telephone interviews and mail surveys. In

each data collection wave where the youth was reported to have attended at least one of the three types of postsecondary institutions, respondents were asked, “Have you received any services, accommodations, or other help from the school to help you do your best there, like a notetaker or more time to take tests because of a learning problem, disability, or other special need?” Students who were reported ever to have received these types of supports from each of the three types of postsecondary schools at any wave were dichotomously coded (1 = *yes*) for receipt at that type of postsecondary institution.

Independent measures. The NTLS2 conceptual framework (Wagner et al., 2003) posits that youth’s experiences, in this case receipt of accommodations and other disability-specific services in postsecondary school, are shaped not only by the immutable characteristics of students (e.g., disability category, gender, race/ethnicity) and their households (e.g., household income, mother’s education level), but also by factors that have occurred in their past (e.g., academic preparation and performance, transition planning), factors that are fluid and can change over time (e.g., self-determination skills), and current experiences (e.g., college major). The specific factors within these larger constructs that were included in the analyses reported here were selected on the basis of this conceptual framework and prior research on factors related to postsecondary experiences and receipt of accommodations and other disability-specific services, which were discussed previously. These measures are described below.

Disability/functioning indicators were the following:

1. Federally defined disability categories, as provided by secondary school districts, were included as dichotomous variables. Two categories—multiple disabilities and deaf-blindness—were combined into a single category because of the small sample sizes.

2. Whether youth had attention deficit disorder or attention deficit/hyperactivity disorder (ADD/ADHD), as reported by parents during the parent interview/survey.
3. Whether youth had any problems with seeing, speaking, conversing, understanding language, appendage use, or health, based on parent interview data (created variable np1NbrProbs). The number of impacted areas ranged from 0 to 6.
4. Number of disciplinary problems in high school, as reported by school staff in the school program survey administered in Waves 1 and 2 (i.e., the number of disciplinary actions, such as being sent to the principal's office, in-school suspensions or detention, out-of-school suspensions, and expulsions). The number of disciplinary problems across the two waves ranged from 0 to 74.

Individual and family demographic measures were reported by parents during interviews/surveys. These included youth's gender (0 = *female*, 1 = *male*); race/ethnicity (African American, Hispanic, with White as the comparison category); mother's highest level of educational attainment (with four response categories: 1 = *less than high school*, 2 = *high school graduate*; 3 = *some college*, 4 = *BA/BS or higher*); and family income, with two dichotomous variables indicating income of less than or equal to \$25,000 and \$25,001–\$50,000 (income greater than \$50,000 was the left-out comparison category).

Self-determination skills in three domains were measured using 26 of 72 items from the Arc's Self-Determination Scale (Wehmeyer, 2000). NLTS2 included a subset of items from three of the four Arc's SDS subscales: self-realization, psychological empowerment, and personal autonomy; specific items in each of the three subscales have been published previously (Valdes et al., 2013). As defined by Wehmeyer (2003), self-realization is having an understanding of one's strengths and limitations. Psychological empowerment refers to a combination of attitudes

and abilities leading individuals to believe they have the ability to achieve desired outcomes. Behavior is considered to be autonomous if a person acts independently, according to his or her own preferences, interests, and abilities without undue external influence or interference. Responses to personal autonomy and self-realization items (15 and 5 items, respectively) were recorded on a 4-point scale, indicating level of agreement (autonomy) or frequency of performing the skill (self-realization); the six psychological empowerment items were dichotomous. The summative scale of self-realization ranged from 5 to 20, the summative scale of personal autonomy ranged from 15 to 60, and the summative scale of psychological empowerment ranged from 0 to 6.

Academic preparation included two measures—completion of a college preparation course of study and GPA in general education coursework. Both measures were based on students' final high school transcripts. Whether a student had completed a college preparation course of study having earned at least 4 credits in English, 3 in mathematics, 3 in social studies, and 3 in science in a general education setting was coded dichotomously (1 = *yes*, 0 = *no*). High school GPA in general education academic coursework was measured on a 0 to 4 scale.

Three *aspects of transition planning* were included as dichotomous variables (1 = *yes*, 0 = *no*) in the analysis: (a) whether a student was reported by school staff to have received “instruction specifically focused on transition planning, e.g., a specialized curriculum designed to help students assess options and develop strategies for leaving secondary school and transitioning to adult life,” (b) whether a student had led IEP/transition planning meetings, and (c) whether postsecondary accommodations were specified on a transition plan as a service need after high school. Data about high school transition planning experiences came from school program surveys.

To explore the impact of *STEM participation* in the present analysis, we categorized reported majors in 2-year and 4-year colleges as having or not having a STEM focus, based on responses to the parent/youth interviews/surveys. Whether students were reported ever to have had a STEM major in postsecondary school was coded dichotomously (1 = *yes*, 0 = *no*).

Data Analyses

Logistic regression analyses were used to explore the independent relationships of student characteristics and school experiences with receipt of disability-specific postsecondary accommodations, modifications, and supports. Separate models were run for receipt of supports at each of three types of postsecondary schools (2-year or 4-year colleges and CTE schools). Odds ratios (*ORs*), significance levels, and the associated 95% confidence intervals were derived. Effect size for dichotomous outcome *ORs* can be calculated by using the Cox Index: $LOR_{Cox} = \ln(OR)/1.65$, where *LOR* is the logged odds ratio, $\ln()$ is the natural logarithm function, and *OR* is the odds ratio (Cox, 1970). Results were weighted by using the cross-wave, cross-instrument weight *wt_anyPYPHSSch* (Valdes et al., 2013), which is appropriate for analyzing multiple waves of NLTS2 data so that findings are nationally representative of postsecondary students with disabilities in the NLTS2 age range and time frame. All models were run with the Stata logistic command using the “svy” prefix, which accommodates the cluster, stratification, and sampling weights used in NLTS2. The Taylor series linearization technique for variance estimation was used to account for lack of independence due to sampling within clusters. The Stata *mim* procedure also was used to adjust regression estimates to account for multiply imputed values for missing data. Regression diagnostic tests revealed that data met regression assumptions. In addition, tests for multicollinearity revealed low variance inflation factors (VIFs) for the independent variables (VIFs were less than 2.0 in all cases).

The indicator for the learning disability (LD) category was omitted from the logistic regression models to serve as a comparison for receipt of accommodations and other disability-specific services by those in other categories. Any category could have been selected to serve as the reference group; the rationale for this choice was that students with learning disabilities constitute more than half the population of students with disabilities in U.S. schools and are commonly used as a comparison group in studies (e.g., Caffrey & Fuchs, 2007; Lane, Carter, Pierson, & Glaeser, 2006; Wagner, Newman, Cameto, Javitz, & Valdes, 2012).

Missing rates for analysis variables ranged from no missing to 31%. No imputation of missing values was conducted for descriptive statistics. Missing data on logistic regression covariates were imputed by using the Stata *ICE* (Imputation by Chained Equations) procedure (Royston, 2009; Royston, Carlin, & White, 2009) to impute 20 imputates. Imputations were performed on all variables used in the analyses to avoid bias associated with listwise deletion and to capture the information contained in the correlation between covariates and the outcome and treatment variables. However, as recommended in the literature (Little, 1992; Little & Rubin, 2002; White, Royston, & Wood, 2011), we did not use imputed values for the outcomes in the analyses.

Results

Students with learning disabilities comprised approximately 70% of the population of students with disabilities at each of the three types of postsecondary schools (2-year and 4-year colleges and CTE schools). Approximately 10% of students with disabilities had ADD/ADHD in addition to their primary disability. Almost two thirds were male, and an equal proportion were White. Twenty-eight percent of postsecondary students with disabilities at 2-year colleges came from families with incomes of \$25,000 or less, as did 19% of those at 4-year colleges and 31% at

CTE schools. Disability-related and demographic characteristics did not vary by type of postsecondary school, except for mother's education; mothers of 4-year college students were more likely to have attained a B.A. degree or higher than mothers of those enrolled in CTE schools (36% vs. 15%, $p < .05$). Thirty-eight percent of postsecondary students at 2-year colleges and 35% at 4-year colleges had a STEM major.

Approximately 25% of students with disabilities in 2-year colleges had received accommodations and other disability-specific services, as had 22% of those at 4-year colleges and 15% of those at CTE schools. Newman and Madaus (2014) provided more comprehensive information about specific types of accommodations and services received across postsecondary school types. [Table 1 presents the results of logistic regression analyses relating aspects of students' disabilities, demographics, and educational experiences to their receipt of accommodations and other disability-specific services from 2- or 4-year colleges and CTE schools.](#)

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Disability Characteristics

Across types of postsecondary schools, the likelihood that postsecondary students received accommodations and other disability-specific services differed with the nature of their disabilities. Those with more apparent disabilities were more likely to receive supports. That is, students with hearing, visual, or orthopedic impairments; autism; or multiple disabilities or deaf-blindness were more likely to receive help than those with learning disabilities, particularly at 2-year and 4-year colleges. Students with hearing impairments were more likely than those with learning disabilities to receive accommodations and other disability-specific services across all types of postsecondary schools ($OR = 4.1$, $p < .001$ at 2-year colleges; $OR = 7.8$, $p < .01$ at 4-

year colleges; $OR = 6.6, p < .05$ at CTE schools). The odds that students with visual impairments received accommodations and other disability-specific services at 2-year colleges were more than 7 times those for students with learning disabilities ($OR = 7.1, p < .001$), and at 4-year colleges the odds ratio was more than 39 times that for students with learning disabilities ($OR = 39.4, p < .01$). Students with orthopedic impairments were more likely than those with learning disabilities to receive supports at 2-year and 4-year colleges ($OR = 4.6, p < .001$ and $OR = 14.3, p < .01$, respectively). The odds that students with autism received accommodations and other disability-specific services were almost 3 times ($OR = 2.9, p < .001$) and the odds for students with multiple disabilities or deaf-blindness were more than 6 times those for students with learning disabilities at 2-year colleges ($OR = 6.2, p < .001$). Students with speech/language impairments were less likely than those with learning disabilities to receive supports at CTE schools ($OR = 0.1, p < .05$). Having ADD/ADHD in addition to a primary disability also increased the likelihood of receiving postsecondary supports at 4-year colleges ($OR = 6.9, p < .05$). The number of affected functional domains and disciplinary problems experienced in high school were not significantly related to receipt of accommodations and other disability-specific services in college.

Individual/Family Demographics

Neither individual nor family demographics (including gender, race/ethnicity, and mother's education level) were significantly related to receipt of accommodations and other disability-specific services in postsecondary school, except family household income. Students from households with annual incomes of \$25,000 or less were less likely than students from households with incomes greater than \$50,000 to receive accommodations and other disability-specific services in 4-year colleges ($OR = 0.1, p < .05$).

Self-Determination

Performance on two subscales of the Arc's SDS, autonomy and psychological empowerment, were not significantly related to receipt of accommodations and other disability-specific services from postsecondary schools. However, higher scores on the self-realization subscale were negatively related to receipt of accommodations and other disability-specific services in 2-year colleges ($OR = 0.8, p < .01$).

High School Academic Preparation and College Major

Completion of college preparation coursework in high school and GPA in high school general education academic courses were not related to the receipt of accommodations and other disability-specific services in college. Having a STEM major in college also was not significantly related to receipt of postsecondary accommodations and other disability-specific services.

High School Transition Planning Experiences

High school transition planning activities were related to receipt of accommodations and other disability-specific services in postsecondary school. Students at 2-year colleges who had received education in high school specifically focused on the transition planning process were more likely to get postsecondary help ($OR = 3.1, p < .01$). In addition, students at 2-year colleges and CTE schools who had a transition plan that specifically identified postsecondary accommodations as a needed support after high school were more likely to receive them in college ($OR = 2.5, p < .05$, and $OR = 8.1, p < .05$, respectively).

Discussion

Colleges offer a variety of accommodations and supports for students with disabilities, but, unlike in secondary schools, postsecondary students must proactively seek out and access

these services. Recent data indicate that disclosure rates are low at the postsecondary level, and the present results provide the most detailed information to date on which students receive disability services and which are less likely to receive them. Understanding this profile could be of particular importance to secondary special educators and transition specialists. Knowledge of those student characteristics that lead to or work against receipt of accommodations and other disability-specific services can help secondary professionals better target interventions to assist students in developing the self-advocacy skills necessary to negotiate the transition to postsecondary education and help ensure that transition planning directly addresses issues related to receipt of postsecondary accommodations and other disability-specific services.

Although some of the variables that affected help seeking are not alterable (e.g., type of disability, family income), targeted interventions may be of assistance in these cases. For example, students with more apparent disabilities, such as hearing, visual, or orthopedic impairments or multiple disabilities or deaf-blindness, were more likely than those with less-visible disabilities to receive accommodations and other disability-specific services. Specifically, students with visual or orthopedic impairments were more likely than those with learning disabilities to receive accommodations and other disability-specific services at 2-year and 4-year colleges but not at CTE schools. Students with ADD/ADHD were more likely than those who did not have this type of disability to receive accommodations and other disability-specific services at 4-year institutions. As noted, students with mental health issues and cognitive disabilities such as LD have expressed concern about stigma and discrimination as a result of disclosure (Kurth & Mellard, 2006; Martin, 2010; Salzer et al., 2008). In addition, students from lower-income families were less likely than students from families with incomes greater than \$50,000 to receive accommodations and other disability-specific services at 4-year colleges.

Given that college students with disabilities from lower-income families tend to have more significant disabilities (Wolanin, 2005), this is a finding that warrants additional research and attention. Thus, the present results indicate that students with less-visible disabilities, as well as students from families with lower incomes, may require additional information about the need for self-disclosure and, more importantly, opportunities to learn, practice, and develop these skills while in secondary school.

In contrast, variables related to receipt of accommodations and other disability-specific services were directly related to aspects of student self-determination and high school transition planning experiences, both of which can be alterable. First, although scores on two subscales of self-determination (autonomy and psychological empowerment) were not related to receipt of accommodations or disability-specific services, students with greater self-realization (confidence in their abilities and knowing how to make up for limitations) were less likely to receive this type of support at 2-year schools but not at other types of institutions. Klassen (2002, 2007) reported that students with LD tend to overestimate their skills in a range of academic and nonacademic areas. Possibly, students at 2-year schools in the present sample also overestimated their ability to overcome the limitations caused by their disability and did not seek services that could assist them. The literature we examined points to the importance of self-determination and indicates that many students with disabilities lack understanding of both the impact of their disability and available supports (e.g., Barber, 2012; Denhart, 2008; Getzel & Thoma, 2008; Lightner et al., 2012). The present results may indicate a need to work more intensely with students to ensure that they have accurate understanding of the effects of their disabilities on their learning (self-realization) and the possible role that postsecondary services can play in offsetting disability impacts. Transition planning activities could directly address these self-perceptions and provide

students with knowledge of available and potentially valuable support services at the college level.

In fact, particularly noteworthy in the present results is a relationship between high school transition planning activities and receipt of postsecondary accommodations and supports. Students who received education specifically on transition planning skills designed to help them assess options and develop strategies for leaving high school and transitioning to adult life were more likely to receive accommodations and disability-specific supports at 2-year colleges. In addition, those who had a transition plan that directly specified postsecondary accommodations and supports as a needed post-high school service were more likely to seek these types of supports at 2-year colleges and CTE schools. These results corroborate the finding of Lightner et al. (2012), who reported that students who self-disclosed earlier in their college careers reported having received more transition planning than students who self-disclosed later. Clearly, such transition planning activities are practices that high school special education staff and transition specialists can and should implement, and the present results indicate that such activities can influence the likelihood that students will seek out and receive accommodations and other disability-specific services at the postsecondary level. It is critical to note, however, that NLTS2 data indicate that only 64% of secondary students with disabilities received transition planning education. Additional work needs to be done in this area to improve the transition planning education that students are receiving.

Limitations

The findings reported here make a unique contribution to the knowledge base on factors related to receipt of disability-specific supports by postsecondary students with disabilities. However, several limitations should be considered. Findings were based on correlational

analyses; therefore, no inferences about causal relationships should be attributed to the results. In addition, this work was based on logistic regression analysis, which provided information about the unique portion of associations of the independent variable with the dependent variable. It is important to be aware that regression analysis does not provide information about the associations that are shared with other independent variables, information that also may be helpful in interpreting associations (Thompson, Diamond, McWilliam, Snyder, & Snyder, 2005). For example, two or more independent variables that share association with the dependent variable may not have statistically significant regression coefficients, even though jointly they are associated with changes in the outcome.

As a secondary analysis, this study was constrained by the NLTS2 design and the items available in the data set. Limited information was available about the transition planning education that students received during high school, beyond school staffs' responses to a dichotomous item on a school survey indicating whether the student had received that type of instruction. Future work is needed to understand better the specific focus and content of transition planning education and the optimal timing for providing that type of instruction during a student's high school career.

Limitations also are noted for several NTLS2 data sources used in the analyses. School district rosters provided the data for students' disability categories. Differences in criteria for identification from state to state (Mandell & Palmer, 2005) resulted in wide variation in functioning among students in each disability category. Several variables, including most importantly the postsecondary service receipt outcome measure, were based on parent and postsecondary student self-report and could not be verified. Service receipt rates may have been underreported because parents and youth may have been unaware of the types of postsecondary

supports received. The data source for the self-determination measures (autonomy, self-realization, and psychological empowerment) included only a subset of items from three of the four subscales in the Arc's SDS. We therefore were unable to explore the relationship between a global self-determination measure and receipt of postsecondary services and accommodations. Research has found the three partial measures included in the analyses to be "conceptually and psychometrically sound" (Shogren, Kennedy, Dowsett, & Little, 2014, p. 229). Caution, however, should be used in interpreting the findings related to the three self-determination subscales because these scales are not representative of the range of responses on the overall scales from which these items are drawn (Shogren, Kennedy, Dowsett, & Little, 2014). In addition, only those students capable of participating in the direct assessment were administered these self-determination subscales; results therefore may not be representative of the full population of students with disabilities. However, the large majority of postsecondary students were considered to be capable of participating in the direct assessment, with less than 1% of postsecondary students identified as needing an alternative assessment. Finally, the NLTS2 data set has a substantial amount of missing data. As noted earlier, missing data for independent variables included in logistic regression models were imputed by using the Stata ICE procedure, although we did not use imputed values for the outcome variables.

Areas for Future Research

The present results are drawn from a large-scale, nationally representative data set and thus provide important information regarding the profile of students who seek out and receive disability supports and services at the postsecondary level. However, additional research still is needed to understand more fully which students self-disclose and receive accommodations and other disability-specific services and, beyond that, the impact of such services on postsecondary

retention and graduation. Additional analyses are warranted to confirm, through more rigorous experimental or quasi-experimental methods, the relationships identified in the current study. Future research also is required to understand better the mechanism that underlies the relationships among transition planning education, having had a transition plan that directly specified postsecondary supports as a needed post-high school service, and receipt of postsecondary supports. It is equally important to examine the characteristics of transition planning education, specifically its content, the optimal grade level for receipt, and the duration of this planning, as well as the characteristics of schools and the special education team structures that offer this type of instruction.

The current study focused on receipt of accommodations and other disability-specific services in postsecondary school. However, postsecondary students are more likely to seek out the types of supports that are available to the general student body, such as going to a writing center or a study center, than to disclose a disability and request disability-specific supports (Newman et al., 2011). Studies that examine the factors related to receipt of generally available supports, particularly research focused on the relationship between transition planning experiences and receipt of these types of supports, would be a valuable addition to the field and would provide secondary programs with a road map of transition activities that directly influence student help-seeking behavior at the college level.

Future research should explore more fully the interplay of self-determination and receipt of disability services at the college level. Although self-determination is a significant focus of transition research and practice, the present results indicate that scores on two subscales of self-determination were not related to receipt of accommodations and other disability-specific services at the college level. Clearly, this is an area in need of additional investigation.

Beyond focusing on the relationship between high school factors and postsecondary receipt of accommodations and other disability-specific services, in light of the low postsecondary completion rate for students with disabilities, particularly from 4-year institutions (Barber, 2012; Newman et al., 2011), it is perhaps even more important to examine comprehensively the linkages between receipt of both disability-specific and generally available postsecondary services and their impact on retention and graduation. Such findings would be invaluable to both secondary transition programs and college disability service programs and could serve as a starting point for identifying evidence-based practices in higher education and disability services.

The present study looked at student-specific variables and did not consider institutional factors that might influence the availability—and thus the receipt—of various accommodations and other disability-specific services. Therefore, analysis of institutional variables (e.g., type of institution, mission, size, level of disability support) that impact the availability and receipt of particular types of accommodations and services would be an important consideration to understand more fully the factors that influence student receipt of services.

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Table 1

Logistic Regression Results for Postsecondary Student Receipt of Disability-Specific Accommodations, Modifications, or Services, by Postsecondary School Type

Characteristic	2-Year college		4-Year college		CTE school	
	Odds ratio ^c	95% CI	Odds ratio ^c	95% CI	Odds ratio ^c	95% CI
Disability/functioning						
Primary disability category ^a (compared with learning disability)						
Speech/language impairments	0.60	[0.28, 1.29]	0.22	[0.03, 1.64]	0.06*	[0.00, 0.93]
Intellectual disabilities	1.12	[0.33, 3.75]	6.09	[0.47, 79.60]	5.04	[0.29, 87.80]
Emotional disturbance	0.52	[0.18, 1.51]	0.23	[0.02, 3.49]	0.35	[0.02, 6.80]
Hearing impairment	4.11***	[1.88, 8.97]	7.78**	[1.58, 38.22]	6.61*	[1.19, 36.58]
Visual impairment	7.05***	[2.93, 16.94]	39.42**	[3.59, 432.83]	6.32	[0.83, 47.86]
Orthopedic impairment	4.57***	[2.08, 10.00]	14.33**	[2.80, 73.27]	2.00	[0.24, 16.78]
Other health impairment	0.97	[0.51, 1.86]	0.88	[0.15, 5.33]	0.38	[0.07, 2.00]
Autism	2.96*	[1.04, 8.44]	1.16	[0.09, 15.26]	15.04	[0.67, 338.39]
Traumatic brain injury	0.96	[0.31, 3.00]	1.51	[0.21, 10.57]	0.28	[0.02, 4.32]
Multiple disabilities/ deaf-blindness	6.23***	[2.39, 16.25]	10.12	[0.88, 115.94]	1.82	[0.17, 19.50]
Also has ADD/ADHD ^b	1.60	[0.73, 3.49]	6.92*	[1.35, 35.40]	2.19	[0.51, 9.46]

Characteristic	2-Year college		4-Year college		CTE school	
	Odds ratio ^c	95% CI	Odds ratio ^c	95% CI	Odds ratio ^c	95% CI
Number of affected functional domains	1.20	[0.94, 1.54]	1.03	[0.89, 1.20]	0.99	[0.84, 1.17]
Number of disciplinary problems in high school	0.97	[0.91, 1.04]	1.08	[0.66, 1.76]	0.93	[0.50, 1.75]
Student demographics						
Gender (male vs. female)	0.69	[0.32, 1.48]	0.76	[0.18, 3.18]	0.74	[0.14, 4.01]
Race/ethnicity (compared with White)						
African American	0.83	[0.36, 1.96]	2.84	[0.45, 18.08]	1.01	[0.12, 8.22]
Hispanic	0.62	[0.21, 1.85]	2.72	[0.45, 16.56]	0.43	[0.03, 5.49]
Family demographics						
Mother's education	0.90	[0.62, 1.31]	1.37	[0.66, 2.85]	1.03	[0.48, 2.22]
Household income (compared with >\$50,000)						
≤\$25,000	0.40	[0.16, 1.02]	0.11*	[0.01, 0.92]	0.25	[0.03, 2.22]
\$25,001–\$50,000	0.66	[0.30, 1.45]	0.29	[0.05, 1.68]	0.20	[0.03, 1.34]
Arc's Self-Determination Scale subscale scores						
Autonomy	1.05	[0.97, 1.13]	1.03	[0.90, 1.19]	1.07	[0.91, 1.27]
Psychological empowerment	1.29	[0.87, 1.92]	0.83	[0.39, 1.78]	0.86	[0.34, 2.16]
Self-realization	0.81**	[0.69, 0.95]	0.73	[0.49, 1.08]	0.97	[0.66, 1.42]
Academic preparation						
Completed a college prep coursework	1.29	[0.60, 2.75]	3.25	[0.61, 17.17]	0.59	[0.13, 2.67]

Characteristic	2-Year college		4-Year college		CTE school	
	Odds ratio ^c	95% CI	Odds ratio ^c	95% CI	Odds ratio ^c	95% CI
GPA in general education academic courses	1.03	[0.62, 1.71]	2.58	[0.54, 12.36]	0.58	[0.20, 1.70]
High school IEP/transition plan						
Received transition planning education	3.09**	[1.38, 6.92]	2.31	[0.37, 14.44]	2.83	[0.55, 14.53]
Postsecondary accommodations and supports specified						
on transition plan	2.48*	[1.15, 5.32]	0.89	[0.17, 4.68]	8.12*	[1.19, 55.35]
Student led IEP/transition planning meeting	1.18	[0.55, 2.53]	0.56	[0.12, 2.60]	2.59	[0.42, 16.05]
STEM major in college	1.45	[0.78, 2.68]	0.46	[0.08, 2.70]	1.35	[0.35, 5.28]
	1930		590		650	
R^2	.18		.21		.19	

Note. Unweighted sample size numbers reported here are rounded to the nearest 10 as required by the restricted data use agreement with the U.S. Department of Education. CI = confidence interval; CTE = career and technical education.

^aDisability category from school district.

^bDisability category from parent.

^c Effect size for dichotomous outcomes can be calculated by using the Cox Index: $LOR_{Cox} = \ln(OR)/1.65$, where LOR is the logged odds ratio, $\ln()$ is the natural logarithm function, and OR is the odds ratio. D. R. Cox, 1970, *Analysis of Binary Data*, New York, NY: Chapman & Hall/CRC.

* $p < .05$. ** $p < .01$. *** $p < .001$.